

AMENDMENTS TO THE CLAIMS

Kindly amend claims 1-4, 6-10, 17, 19-22, 27, 39, 58-59, 67-70, 74, and 79, and add new claims 83-113 as shown in the following listing of claims. The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (currently amended) An integrated circuit functioning as ~~an InfiniBand channel~~
~~a network interface adapter and an InfiniBand switch~~, comprising:
 - a plurality of ~~InfiniBand~~ media access controllers (MACs), for transceiving
~~InfiniBand~~ packets;
 - a ~~local bus interface~~ plurality of local bus interfaces, for performing addressed data
transfers on a local bus plurality of local buses coupled thereto;
 - a bus router, for performing transport layer operations between said plurality of
~~InfiniBand~~ MACs and said ~~local bus interface~~ plurality of local bus
interfaces;
 - a memory, shared by said plurality of MACs, said local bus interface, and said
bus router, for buffering data received thereby; and
 - a transaction switch, coupled to each of said memory, said plurality of ~~InfiniBand~~
MACs, said ~~local bus interface~~ plurality of local bus interfaces, and said
bus router, for switching data and transactions therebetween.
2. (currently amended) The integrated circuit of claim 1, further comprising:
 - a plurality of transaction queues, associated with said plurality of ~~InfiniBand~~
MACs, said ~~local bus interface~~ plurality of local bus interfaces, and said
bus router, coupled to said transaction switch, for storing said transactions.
3. (currently amended) The integrated circuit of claim 1, wherein said memory
comprises a random access memory. ~~further comprising:~~
 - ~~a memory, shared by said plurality of InfiniBand MACs, said plurality of local~~
~~bus interfaces, and said bus router, for buffering data received thereby.~~
4. (currently amended) The integrated circuit of claim 1 ~~claim 3~~, wherein said
transaction switch comprises:
 - a buffer manager, for allocating portions of said memory to said plurality of
~~InfiniBand~~ MACs, said ~~local bus interface~~ plurality of local bus interfaces,
and said bus router, for buffering said data received thereby.
5. (previously presented) The integrated circuit of claim 4, wherein said buffer
manager performs said allocating in an as-needed manner.

6. (currently amended) The integrated circuit of claim 1 ~~claim 3~~, wherein said bus router is configured to write an ~~InfiniBand~~ packet header into said memory via said transaction switch along with addressed data stored in said memory by ~~one of~~ said local bus interface plurality of local bus interfaces to create an ~~InfiniBand~~ packet.
7. (currently amended) The integrated circuit of claim 1 ~~claim 3~~, wherein said local bus interface plurality of local bus interfaces ~~is~~ are configured to read a payload portion of an ~~InfiniBand~~ packet stored in said memory and to transmit said payload portion on said local bus ~~one or more of the plurality of local buses~~ coupled thereto.
8. (currently amended) The integrated circuit of claim 7, wherein said payload portion is located in said memory at an offset specified in a transaction posted by said bus router to said local bus interface plurality of local bus interfaces via said transaction switch.
9. (currently amended) The integrated circuit of claim 1, wherein ~~at least one of~~ said local bus interface plurality of local bus interfaces comprises a PCI bus interface.
10. (currently amended) The integrated circuit of claim 1, wherein said transaction switch is configured to receive a transaction posted by a first of said plurality of ~~InfiniBand~~ MACs in response to a packet received by said first of said plurality of ~~InfiniBand~~ MACs and to selectively switch said transaction to one of a second of said plurality of ~~InfiniBand~~ MACs and said bus router.
11. (original) The integrated circuit of claim 10, wherein said transaction switch selectively switches said transaction based on an InfiniBand destination local identification value included in said transaction.
12. (original) The integrated circuit of claim 11, wherein said transaction switch selectively switches said transaction to said bus router if an entry associated with said InfiniBand destination local identification value in a mapping table of said transaction switch indicates said transaction is destined for said bus router.
13. (original) The integrated circuit of claim 12, wherein said transaction switch selectively switches said transaction to one of said plurality of InfiniBand MACs based on which of said plurality of InfiniBand MACs is associated with said InfiniBand destination local identification value in said mapping table if said entry indicates said transaction is not destined for said bus router.
14. (original) The integrated circuit of claim 11, wherein said first MAC parses said InfiniBand destination local identification value from said packet.
15. (original) The integrated circuit of claim 10, wherein said transaction includes an InfiniBand virtual lane number parsed from said packet.
16. (original) The integrated circuit of claim 10, wherein said transaction includes a destination queue pair number parsed from said packet.

17. (currently amended) The integrated circuit of claim 1, wherein said transaction switch is configured to receive a transaction posted by said bus router and to selectively switch said transaction to one of said plurality of ~~InfiniBand~~-MACs and ~~one of one of~~ said local bus interface~~plurality of local bus interfaces~~.
18. (original) The integrated circuit of claim 17, wherein said transaction switch selectively switches said transaction based on a transaction type value included in said transaction.
19. (currently amended) The integrated circuit of claim 18, further comprising:
a second local bus interface, for performing addressed data transfers on a second local bus coupled thereto;
wherein said transaction switch selectively switches said transaction to one of said first and second~~plurality of~~ local bus interfaces based on whether a local bus address included in said transaction falls into one or more predetermined address ranges of said first and second~~the plurality of~~ local buses.
20. (currently amended) The integrated circuit of claim 17, wherein said transaction includes an address in an address range of said local bus~~the plurality of local buses~~.
21. (currently amended) The integrated circuit of claim 1, further comprising:
a second local bus interface, coupled to said transaction switch, for performing addressed data transfers on a second local bus coupled thereto; and
a local bus bridge coupled between said first and second local bus interfaces~~plurality of local bus interfaces~~ for buffering data therebetween.
22. (currently amended) The integrated circuit of claim 1, further comprising:
a second local bus interface;
wherein said transaction switch is configured to receive a transaction posted by a said first local bus interface~~of said plurality of local bus interfaces~~ in response to an addressed data transfer received by said first local bus interface~~of said plurality of local bus interfaces~~ and to switch said transaction to a said second local bus interface~~of said plurality of local bus interfaces~~.
23. (previously presented) A transaction switch for switching data between a plurality of data devices, comprising:
a memory, shared by the plurality of data devices for buffering data received thereby;
multiplexing logic, coupled to said memory, for controlling the transfer of data between the plurality of data devices and said memory; and
control logic, coupled to said multiplexing logic, for controlling said multiplexing logic;

- wherein the plurality of data devices comprise a plurality of packetized data devices and a plurality of addressed data devices;
- wherein said control logic is configured to selectively control said multiplexing logic to transfer data through said memory between two of said packetized data devices and between one of said packetized data devices and one of said addressed data devices.
24. (original) The transaction switch of claim 23, wherein said control logic is further configured to selectively control said multiplexing logic to transfer data through said memory between two of said addressed data devices.
25. (original) The transaction switch of claim 23, wherein said control logic is configured to selectively control said multiplexing logic to transfer data through said memory between two of said packetized data devices and between one of said packetized data devices and one of said addressed data devices concurrently.
26. (original) The transaction switch of claim 23, wherein at least two of said packetized data devices comprise InfiniBand interfaces.
27. (currently amended) The transaction switch of claim 23, wherein at least two of said addressed data devices comprise PCI ~~bus~~ interfaces.
28. (original) The transaction switch of claim 23, further comprising:
a buffer manager, for allocating portions of said memory to the plurality of data devices for buffering said data.
29. (original) The transaction switch of claim 28, wherein said buffer manager is configured to perform said allocating on substantially a first-come-first-serve basis.
30. (original) The transaction switch of claim 23, wherein said control logic is configured to selectively control said multiplexing logic to transfer data through said memory between two of said packetized data devices and between one of said packetized data devices and one of said addressed data devices in response to a transaction posted to the transaction switch by the plurality of data devices.
31. (original) The transaction switch of claim 30, wherein said transaction comprises a command to transfer data between said memory and one of the plurality of data devices.
32. (original) The transaction switch of claim 31, wherein said transaction comprises an address of a buffer within said memory wherein is stored said data to be transferred in response to said command.
33. (original) The transaction switch of claim 32, wherein said transaction comprises an offset within said buffer for addressing portions of said data.
34. (original) The transaction switch of claim 30, wherein said transaction comprises a tag for uniquely identifying said transaction from other transactions posted to the transaction switch by the plurality of data devices.

35. (original) The transaction switch of claim 23, wherein the plurality of data devices comprise a transport layer device, wherein the transaction switch is configured to receive transactions from said transport layer device for performing protocol translation of data between said one of said packetized data devices and said one of said addressed data devices.
36. (previously presented) A transaction switch for switching transactions and data between a plurality of data interfaces, the transaction switch comprising:
- a memory, shared by the plurality of data interfaces, for buffering data received thereby;
 - a plurality of transaction queues, associated with each of the plurality of data interfaces, configured to store transactions, said transactions adapted to convey information to enable the plurality of data interfaces to transfer said data according to a plurality of disparate data transfer protocols supported thereby; and
 - control logic, coupled to said memory and said plurality of transaction queues, configured to route said data through said shared memory between the plurality of data interfaces and to switch said transactions between the plurality of data interfaces.
37. (original) The transaction switch of claim 36, wherein said control logic is configured to route said data between the plurality of data interfaces through said shared memory in response to said transactions received from said plurality of transaction queues.
38. (original) The transaction switch of claim 36, wherein at least a portion of said plurality of transaction queues is configured to store transactions adapted to convey information necessary to transfer data according to an InfiniBand protocol.
39. (currently amended) The transaction switch of claim 36, wherein at least a portion of said plurality of transaction queues is configured to store transactions adapted to convey information necessary to transfer data according to an PCI ~~bus~~ protocol.
40. (original) The transaction switch of claim 36, wherein said control logic is further configured to modify a transaction received from one of said plurality of transaction queues associated with a first of the plurality of data devices and to send said modified transaction to another one of said plurality of transaction queues.
41. (original) An integrated circuit, comprising:
- at least three data interfaces;
 - a memory, shared by said at least three data interfaces for buffering data therebetween; and

a transaction switch, coupled to said at least three data interfaces and said memory, for dynamically allocating portions of said memory to said at least three data interfaces for storing data therein, and for controlling access to said allocated portions of said memory by each of said at least three data interfaces;

wherein at least one of said at least three data interfaces is of a different type than the others.

42. (original) The integrated circuit of claim 41, wherein at least one of said at least three data interfaces is a packetized data interface and at least one of said at least three data interfaces is an addressed data interface.
43. (original) The integrated circuit of claim 42, wherein said at least one packetized data interface is an InfiniBand interface.
44. (original) The integrated circuit of claim 42, wherein said at least one addressed data interface is a PCI interface.
45. (original) The integrated circuit of claim 41, wherein said transaction switch is configured to receive a transaction from a first of said at least three data interfaces and to selectively switch said transaction to one of another of said at least three data interfaces.
46. (original) The integrated circuit of claim 45, wherein said transaction is a packetized data transaction including packet destination information.
47. (original) The integrated circuit of claim 46, wherein said transaction switch is configured to selectively switch said packetized data transaction to said another of said at least three data interfaces based on said packet destination information and information stored in a mapping table of said transaction switch.
48. (original) The integrated circuit of claim 47, wherein said transaction switch is configured to selectively switch said packetized data transaction to said another of said at least three data interfaces further based on information stored in a table mapping said packet destination information to said at least three data interfaces.
49. (original) The integrated circuit of claim 45, wherein in a first instance of said transaction said first and one of another of said at least three data interfaces are of a same type of interface, wherein in a second instance of said transaction said first and one of another of said at least three data interfaces are of a different type of interface.
50. (original) The integrated circuit of claim 49, wherein in said first instance each of said first and one of another of said at least three data interfaces is a packetized data interface type.
51. (original) The integrated circuit of claim 49, wherein in said second instance said first of said at least three data interfaces is a packetized data interface type and said one of another of said at least three data interfaces is an interface type capable of translating between packetized and addressed data.

52. (original) The integrated circuit of claim 49, wherein in said second instance said first of said at least three data interfaces is a packetized data interface type and said one of another of said at least three data interfaces is a transport level data interface.
53. (original) The integrated circuit of claim 45, wherein said transaction switch is configured to modify said transaction received from said first of said at least three data interfaces prior to selectively switching said received transaction to said one of another of said at least three data interfaces.
54. (original) The integrated circuit of claim 41, wherein said transaction switch is configured to receive a transaction from a first of said at least three data interfaces and to selectively switch said received transaction to two or more of another of said at least three data interfaces.
55. (original) The integrated circuit of claim 41, further comprising:
a plurality of transaction queues, coupled between said transaction switch and said at least three data interfaces, for storing transactions between said transaction switch and said at least three data interfaces.
56. (original) The integrated circuit of claim 55, further comprising a programmable register for specifying for at least a plurality of said plurality of transaction queues a number of transaction slots to be allocated for storing said transactions.
57. (original) The integrated circuit of claim 41, wherein at least one of said at least three data interfaces comprises a bus router for performing a transport layer function between at least two other of said at least three data interfaces which support disparate data protocols.
58. (currently amended) The integrated circuit of claim 57, wherein at least one of said at least three data interfaces comprises a local bus interface for interfacing to a local bus, wherein at least one of said at least three data interfaces comprises a MAC for interfacing to a network, wherein said bus router is configured to perform said transport layer function by writing packet header information into said allocated portions of said memory in front of data written into said allocated portions of said memory by said local bus interface~~claim 41, further comprising: a bus router, coupled to the transaction switch, for performing transport layer functions between said at least three data interfaces having different data protocols.~~
59. (currently amended) The integrated circuit of claim 58, wherein said bus router is configured to write packet header information into said allocated portions of said memory before said MAC reads said packet from said allocated portion of said memory for writing to said network, without copying said data to another memory.
60. (original) The integrated circuit of claim 41, wherein a first of said at least three data interfaces is configured to post a transaction to said transaction switch for instructing a second of said at least three data interfaces to transfer data to or from

- an offset in one of said allocated portions of said memory associated with a payload portion of a data packet.
61. (original) The integrated circuit of claim 41, wherein said transaction switch is further configured to de-allocate said portions of said memory.
62. (original) The integrated circuit of claim 41, wherein said transaction switch is configured to dynamically allocate said portions of said memory to said at least three data interfaces on a substantially as needed basis.
63. (original) An integrated circuit, comprising:
a plurality of packetized data interfaces;
a plurality of addressed data interfaces; and
a transaction switch, coupled to said plurality of packetized data interfaces and to said plurality of addressed data interfaces;
wherein said transaction switch is configured to switch a packetized data transaction from a first of said plurality of packetized data interfaces to a second of said plurality of packetized data interfaces and to switch an addressed data transaction from a first of said addressed data interfaces to a second of said addressed data interfaces.
64. (original) The integrated circuit of claim 63, further comprising:
a routing device, coupled to said transaction switch, for performing protocol translation between said plurality of packetized data interfaces and said plurality of addressed data interfaces;
wherein said transaction switch is further configured to switch a packetized data transaction from said first of said plurality of packetized data interfaces to said routing device.
65. (original) The integrated circuit of claim 64, wherein said transaction switch is further configured to switch an addressed data transaction from said routing device to said second of said plurality of addressed data interfaces.
66. (original) The integrated circuit of claim 63, wherein each of said plurality of packetized data interfaces comprises a packetized interface selected from a list comprising an Ethernet interface, a FibreChannel interface, an IEEE 1394 interface, a SONET interface, an ATM interface, a SCSI interface, a serial ATA interface, an OC-48 interface, and an OC-192 interface.
67. (currently amended) A network interface adapter~~An InfiniBand hybrid channel adapter/switch~~, comprising:
a plurality of InfiniBand network ports;
at least one addressed data bus interface;
a memory, for buffering data received by said plurality of InfiniBand network ports and said at least one addressed data bus interface;

- a transport layer engine for routing said data between said plurality of ~~InfiniBand~~
network ports and said at least one addressed data bus interface;
- a plurality of transaction queues, associated with each of said plurality of
~~InfiniBand~~network ports, said at least one addressed data bus interface
and said transport layer engine, for storing transactions; and
- a transaction switch, coupled to said plurality of transaction queues, configured to
route said transactions between said plurality of ~~InfiniBand~~network ports,
said at least one addressed data bus interface and said transport layer
engine.
68. (currently amended) The network interface adapter ~~InfiniBand hybrid channel
adapter/switch~~ of claim 67, wherein at least a subset of said plurality of
transaction queues comprise an input queue for said plurality of ~~InfiniBand~~
network ports to post said transaction to said switch.
69. (currently amended) The network interface adapter ~~InfiniBand hybrid channel
adapter/switch~~ of claim 67, wherein said plurality of transaction queues comprise
an output queue for said transaction switch to send said transaction to said
plurality of ~~InfiniBand~~network ports and said at least one addressed data bus
interface.
70. (currently amended) The network interface adapter ~~InfiniBand hybrid channel
adapter/switch~~ of claim 67, wherein said at least one addressed data bus interface
is coupled to a data bus selected from a list comprising a Rapid I/O bus, a VESA
bus, an ISA bus, a PCI bus, an LDT bus, an SDRAM bus, a DDR SDRAM bus,
and a RAMBUS.
71. (original) A method of transferring data in a network device comprising a plurality
of packetized data devices, a plurality of addressed data devices, and at least one
routing device, the method comprising:
- switching a packetized data transaction from a first of the plurality of packetized
data devices to a second of the plurality of packetized data devices; and
- switching an addressed data transaction from a first of the plurality of addressed
data devices to a second of the plurality of addressed data devices.
72. (original) The method of claim 71, wherein each of said switching steps is
performed substantially concurrently.
73. (original) The method of claim 71, wherein said packetized data transaction
comprises a transaction associated with an InfiniBand packet transmission.
74. (currently amended) The method of claim 71, wherein said addressed data
transaction comprises a transaction associated with a PCI bus data transfer.
75. (original) The method of claim 71, further comprising:
- switching a packetized data transaction from one of the plurality of packetized
data devices to the routing device.

76. (original) The method of claim 71, further comprising:
- switching an addressed data transaction from the routing device to one of the plurality of addressed data devices; and
 - switching a packetized data transaction from the routing device to one of the plurality of packetized data devices.
77. (original) The method of claim 71, further comprising:
- performing protocol translation in a transfer of data between the packetized data interface and the addressed data interface without double-buffering the data.
78. (original) The method of claim 71, further comprising:
- parsing a packet and generating said packetized data transaction prior to said switching said packetized data transaction.
79. (currently amended) A transaction switch in a network device having a buffer memory and plurality of data devices, including packetized and addressed data devices, the transaction switch comprising:
- a buffer manager, for allocating portions of the buffer memory to the plurality of data devices on an as-needed basis;
 - a plurality of data paths, coupling the buffer memory and the plurality of packetized and addressed data devices, for providing the plurality of data devices access to the buffer memory;
 - a mapping table, for storing packet destination identification information;
 - a plurality of transaction queues, for transferring transactions between the transaction switch and the plurality of data devices; and
 - control logic, coupled to said mapping table and said plurality of transaction queues, for selectively switching transactions ~~data~~ between the plurality of data devices based on said mapping table information and ~~in response to~~ based on contents of said transactions.
80. (previously presented) The transaction switch of claim 23, wherein a single integrated circuit comprises the transaction switch.
81. (previously presented) The transaction switch of claim 36, wherein a single integrated circuit comprises the transaction switch.
82. (previously presented) The network interface adapter of claim 67, wherein a single integrated circuit comprises the InfiniBand hybrid channel adapter/switch.
83. (new) The integrated circuit of claim 1, wherein at least one of said plurality of MACs comprises an Infiniband MAC.
84. (new) The integrated circuit of claim 1, wherein at least one of said plurality of MACs comprises an Ethernet MAC.

- 85. (new) The transaction switch of claim 23, wherein at least one of said at least two of said packetized data devices comprises an Ethernet interface.
- 86. (new) The transaction switch of claim 36, wherein at least a portion of said plurality of transaction queues is configured to store transactions adapted to convey information necessary to transfer data according to an Ethernet protocol.
- 87. (new) The integrated circuit of claim 42, wherein said at least one packetized data interface is at least one Ethernet interface.
- 88. (new) The integrated circuit of claim 63, wherein at least one of said plurality of packetized data interfaces comprises an Infiniband interface.
- 89. (new) The integrated circuit of claim 63, wherein at least one of said plurality of packetized data interfaces comprises an Ethernet interface.
- 90. (new) The network interface adapter of claim 67, wherein at least one of said plurality of network ports comprises an Infiniband port.
- 91. (new) The network interface adapter of claim 67, wherein at least one of said plurality of network ports comprises an Ethernet port.
- 92. (new) The method of claim 71, wherein said packetized data transaction comprises a transaction associated with an Ethernet packet transmission.
- 93. (new) The integrated circuit of claim 1, wherein at least one of said plurality of local bus interfaces comprises an interface to a bus for coupling to a random access memory.
- 94. (new) The transaction switch of claim 23, wherein at least one of said plurality of addressed data devices comprises an interface to a bus for coupling to a random access memory.
- 95. (new) The transaction switch of claim 36, wherein at least one of said plurality of disparate data transfer protocols comprises a protocol for transferring data on a bus with a random access memory.
- 96. (new) The integrated circuit of claim 41, wherein at least one of said at least three data interfaces comprises an interface to a bus for coupling to a random access memory.
- 97. (new) The integrated circuit of claim 63, wherein at least one of said plurality of addressed data interfaces comprises an interface to a bus for coupling to a random access memory.
- 98. (new) The network interface adapter of claim 67, wherein said at least one addressed data bus interface comprises an interface to a bus for coupling to a random access memory.
- 99. (new) The method of claim 71, wherein said local bus interface comprises an interface to a bus for coupling to a random access memory.
- 100. (new) A network interface adapter, comprising:

- a local bus interface, configured to connect the adapter to a local bus and to perform an addressed data protocol on the local bus;
 - a media access controller (MAC), configured to connect the adapter to a network and to perform a packetized data protocol on the network;
 - a transport protocol engine, configured to perform protocol translation from the addressed data protocol to the packetized data protocol by creating a packet from data received on the local bus by the local bus interface;
 - a memory, directly accessible by each of the local bus interface, the MAC, and the transport protocol engine in a random access fashion;
 - a transaction switch, coupled to the local bus interface, the MAC, the transport protocol engine, and the memory, and configured to dynamically allocate a portion of the memory for buffering the data and the packet;
 - wherein the transport protocol engine is configured to perform the protocol translation before the MAC reads the packet from the memory for transmission on the network, wherein the transport protocol engine performs the protocol translation without copying the data to another memory.
101. (new) The network interface adapter of claim 100:
- wherein the transport protocol engine is further configured to perform second protocol translation from the packetized data protocol to the addressed data protocol by identifying a data payload within a second packet received from the network by the MAC and specifying a local bus address for the data payload;
 - wherein the transport protocol engine is further configured to perform the second protocol translation before the local bus interface reads the data payload from the memory for writing on the local bus to the local bus address, wherein the transport protocol engine performs the second protocol translation within the memory without copying the data to another memory.
102. (new) The network interface adapter of claim 100, wherein a single integrated circuit comprises the local bus interface, the MAC, the transport protocol engine, the memory, and the transaction switch.
103. (new) The network interface adapter of claim 100, wherein the transport protocol engine is configured to create the packet by writing a packet header into the memory in front of the data.
104. (new) A network interface adapter, comprising:
- a local bus interface, configured to connect the adapter to a local bus and to perform an addressed data protocol on the local bus;
 - a media access controller (MAC), configured to connect the adapter to a network and to perform a packetized data protocol on the network;

- a transport protocol engine, configured to perform protocol translation from the packetized data protocol to the addressed data protocol by identifying a data payload within a packet received from the network by the MAC and specifying a local bus address for said data payload;
 - a memory, directly accessible by each of the local bus interface, the MAC, and the transport protocol engine in a random access fashion;
 - a transaction switch, coupled to the local bus interface, the MAC, the transport protocol engine, and the memory, and configured to dynamically allocate a portion of the memory for buffering the data payload and the packet;
 - wherein the transport protocol engine is configured to perform the protocol translation before the local bus interface reads the data payload from the memory for writing on the local bus to said local bus address, wherein the transport protocol engine performs the protocol translation without copying the data to another memory.
105. (new) The network interface adapter of claim 104:
- wherein the transport protocol engine is further configured to perform second protocol translation from the addressed data protocol to the packetized data protocol by creating a second packet from data received on the local bus by the local bus interface;
 - wherein the transport protocol engine is further configured to perform the second protocol translation before the MAC reads the second packet from the memory for transmission on the network, wherein the transport protocol engine performs the second protocol translation without copying the data to another memory.
106. (new) The network interface adapter of claim 104, wherein a single integrated circuit comprises the local bus interface, the MAC, the transport protocol engine, the memory, and the transaction switch.
107. (new) The network interface adapter of claim 104, wherein the transport protocol engine is configured to identify the data payload within the packet by specifying to the transaction switch an address of a location within the memory of the data payload.
108. (new) A method for performing a transport layer function without double-buffering in a network interface adapter comprising a local bus interface, a media access controller (MAC), a transport protocol engine, and a memory managed by the transaction switch and directly accessible by each of the local bus interface, the MAC, and the transport protocol engine in a random access fashion, the method comprising:
- allocating, by the transaction switch, a portion of the memory for buffering data received on the local bus by the local bus interface;

writing, by the local bus interface, the data into the allocated portion of the memory;

creating, by the transport protocol engine, with the data a packet within the allocated portion of the memory; and

reading, by the MAC, the packet from the allocated portion of the memory for transmission on a network, after said creating, wherein the transport protocol engine performs said creating the packet without copying the data to another memory.

109. (new) The method of claim 108, further comprising:

allocating, by the transaction switch, a second portion of the memory for buffering a second packet received from the network by the MAC;

writing, by the MAC, the second packet into the second allocated portion of the memory;

identifying, by the transport protocol engine, a data payload within the second packet;

specifying, by the transport protocol engine, a local bus address for the data payload; and

reading, by the local bus interface, the data payload from the second allocated portion of the memory for writing on the local bus to the local bus address, after said identifying and said specifying, wherein the transport protocol engine performs said identifying and said specifying without copying the data to another memory.

110. (new) The method of claim 108, wherein said creating the packet comprises:

writing, by the transport protocol engine, a packet header into the allocated portion of the memory in front of the data.

111. (new) A method for performing a transport layer function without double-buffering in a network interface adapter comprising a local bus interface, a media access controller (MAC), a transport protocol engine, and a memory managed by a transaction switch and directly accessible by each of the local bus interface, the MAC, and the transport protocol engine in a random access fashion, the method comprising:

allocating, by the transaction switch, a portion of the memory for buffering a packet received from the network by the MAC;

writing, by the MAC, the packet into the allocated portion of the memory;

identifying, by the transport protocol engine, a data payload within the packet;

specifying, by the transport protocol engine, a local bus address for the data payload; and

reading, by the local bus interface, the data payload from the allocated portion of the memory for writing on the local bus to the local bus address, after said identifying and said specifying, wherein the transport protocol engine performs said identifying and said specifying without copying the data to another memory.

112. (new) The method of claim 111, comprising:

allocating, by the transaction switch, a second portion of the memory for buffering data received on the local bus by the local bus interface;
writing, by the local bus interface, the data into the second allocated portion of the memory;
creating, by the transport protocol engine, with the data a second packet within the second allocated portion of the memory; and
reading, by the MAC, the second packet from the second allocated portion of the memory for transmission on a network, after said creating, wherein the transport protocol engine performs said creating the second packet without copying the data to another memory.

113. (new) The method of claim 111, wherein said identifying comprises:

specifying, by the transport protocol engine, to the transaction switch an address of a location within the memory of the data payload.